Is the Tobii Pro Spectrum a useful tool for microsaccade researchers?

Nyström, Marcus; Niehorster, Diederick C; Andersson, Richard; Hooge, Ignace

DOI:
10.16910/jemr.11.5

2018

Document Version:
Publisher's PDF, also known as Version of record

SESSION 1: Eye-tracking technology: Latest developments

Is the Tobii Pro Spectrum a useful tool for microsaccade researchers?

Marcus Nyström[1], Diederick C. Niehorster[1,2], Richard Andersson[3], & Ignace T. C. Hooge[4]

[1] *Humanities Lab, Lund University, Sweden*
[2] *Department of Psychology, Lund University, Sweden*
[3] *Tobii AB, Stockholm, Sweden*
[4] *Experimental Psychology, Helmholtz Institute, Utrecht University, Netherlands*

Throughout the history of eye movement research, the exact properties of microsaccades have been debated (Collewijn & Kowler, 2008). Part of the reason is differences in instrumentation (Nyström et al., 2016). Therefore, the introduction of a new eye tracker to record fixational eye movements should always be followed by careful investigation of its data quality and a comparison against currently used and established tools.

We recorded eye movements from four people with a newly introduced stereo camera eye tracker (Tobii Pro Spectrum, 600 Hz and 1200 Hz) and the standard eye tracker in the field (EyeLink 1000 Plus, filtered and unfiltered) during a fixation task. Microsaccades were clearly visible in both systems, and comparable microsaccade rates and amplitudes were found when applying a standard algorithm for microsaccade detection (Engbert & Kliegl, 2003). Precision, defined as the root mean square (RMS) of intersample distances, was similar across the systems in the horizontal direction. However, vertical RMS was a factor two lower in the data recorded with the EyeLink compared with the Tobii Pro Spectrum, indicating higher precision.

We conclude that the Tobii Pro Spectrum is a useful tool for microsaccade researchers.

References

- Collewijn, H., & Kowler, E. (2008). The significance of microsaccades for vision and oculomotor control. *Journal of Vision*, 8(14), 20.1-2021. doi: 10.1167/8.14.20
- Engbert, R., & Kliegl, R. (2003). Microsaccades uncover the orientation of covert attention. *Vision Research*, 43(9), 1035-1045.
- Nyström, M., Hansen, D. W., Andersson, R., & Hooge, I. (2016). Why have microsaccades become larger? Investigating eye deformations and detection algorithms. *Vision Research*, 118, 17-24. doi: 10.1016/j.visres.2014.11.007